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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Missile Defense Agency **Date:** February 2018

<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603884C <i>I Ballistic Missile Defense Sensors</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,165.906	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
MD11: <i>BMDs Radars</i>	1,086.043	242.049	244.332	206.836	-	206.836	226.889	241.306	240.203	237.978	Continuing	Continuing
MD41: <i>Homeland Defense Radar - Hawaii (HDR-H)</i>	-	0.000	21.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.000
MC11: <i>Cyber Operations</i>	3.871	1.230	3.636	1.079	-	1.079	7.788	4.368	1.145	1.168	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	75.992	9.386	9.177	12.961	-	12.961	15.561	21.828	22.410	21.127	Continuing	Continuing

**Program MDAP/MAIS Code:** 362

## Note

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600M was required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$30.800M is required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.

Beginning in FY 2019 the Homeland Defense Radar - Hawaii (HDR-H) will be realigned to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.

Beginning in FY 2019 the Budget Project (MD41) title will change from Pacific Radar to Homeland Defense Radar - Hawaii (HDR-H)

## A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) network of layered Sensors provides essential situational awareness and fire control data for the command and control of BMDS weapon systems, such as Ground-based Midcourse Defense (GMD), Aegis Ballistic Missile Defense (BMD), and Terminal High Altitude Area Defense (THAAD). The suite of remote ground-based sensors provides; early warning, midcourse and terminal ballistic missile defense threat data enabling layered detection and tracking of ballistic missile targets, providing fire-control quality position, velocity, and discrimination data through Ground-Based Midcourse Defense Fire Control (GFC), or Command and Control, Battle Management, Communications (C2BMC).

Overlapping coverage of geographically diverse sensors provides improved threat track data, reduces the impact of the loss of any one sensor, and reduces the potential impact of countermeasures. The extended coverage and accuracy provided by a network of layered sensors increases the defensive footprint and reduces the number of target engagements required, thereby conserving interceptor inventory and maintaining a high probability of successful engagement. Networked forward-based sensors enable C2BMC to pair the best sensor coverage with the best available weapon system to provide the most effective defense against ballistic missile threats.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>		<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>
<p>This program element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. BMDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) PEs.</p> <p>The BMD Sensors Program contributes to regional missile defense through the development, delivery and deployment/redeployment of Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) radars for operations or tests. AN/TPY-2 radars can be configured to operate either as a THAAD Fire Unit Radar (terminal mode) or Forward-Based Radar. These radars are transportable, they add flexibility to respond to geographical changes in threats. Radars provide early warning tracking and discrimination data through all phases of ballistic missile flight. Through the BMDS C2BMC and coalition data links, the AN/TPY-2 provides fire control data to enable remote Standard Missile (SM)-3 engagements by Aegis BMD, and to cue deployed THAAD and U.S. and partner Patriot batteries.</p> <p>The BMDS sensor network includes; the COBRA DANE Radar at Eareckson Air Station, Alaska, the Upgraded Early Warning Radars (UEWRs) at Beale Air Force Base, CA; Fylingdales Royal Air Force, United Kingdom, and Thule Air Base in Greenland for defense of the homeland. The Clear Ultra High Frequency Early Warning Radar (EWR), at Clear Air Force Station, AK, and the Cape Cod EWR, at Cape Cod Air Force Station, MA, are also being upgraded to include missile defense functionality against long-range threats in addition to their existing Missile Warning and Space Surveillance missions. Upgrade activities began in CY 2012 and are expected to be completed in CY 2018. The addition of the Clear UEWR and Cape Cod UEWRs to the BMDS sensor architecture will improve BMDS sensor coverage and provide new engagement options against long-range missile threats from Northeast Asia and Southwest Asia respectively.</p> <p>The Homeland Defense Radar - Hawaii (HDR-H) is a new sensor within the BMDS that addresses NORTHCOM and PACOM radar requirements for the defense of Hawaii. The HDR-H is a long range ballistic missile defense sensor that provides a persistent operational capability for the defense of the Pacific region. It improves the discrimination capability to address multiple threats including the no warning strategic challenges of a road mobile ICBM. The radar will leverage development efforts from other sensor projects to reuse discrimination, low elevation acquisition, and tracking algorithms. The Pacific Radar final testing, integration and delivery is planned for FY 2023.</p> <p>Cyber Operations sustain the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments, and reviews of Plans of Action and Milestones (POA&amp;Ms) for the Sensors mission system.</p> <p>This Program Element also investigates concepts and performs systems engineering to address hypersonic threats.</p> <p>FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+6.400M was required to address emergency warfighting readiness requirements.            +\$6.400M Project MD11-BMDS Radar to implement AN/TPY-2 Noise Mitigation.            FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600M was required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.            +\$19.600M Project MD11 BMDS Radars. This is a base budget requirement.</p>		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency				Date: February 2018		
Appropriation/Budget Activity		R-1 Program Element (Number/Name)				
0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603884C I Ballistic Missile Defense Sensors				
+\$3.600M is required to support Advanced Discrimination efforts focused on countering the emergent threats to the homeland, forward deployed forces, and allies.						
+\$16.000M is required to extend the lifespan of the COBRA DANE radar, which provides critical coverages of North Korean threats. Upgrades include critical life extension redesign and software rehosting to ensure continued operations. This is a base budget requirement.						
FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$30.800M is required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.						
+\$30.800M Project MD11 BMDS Radars. This is a base budget requirement.						
+\$3.000M is required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication.						
+\$5.000M is required to conduct studies and evaluations in support of a Medium Range Discriminating Radar (MRDR) to address gaps in the BMDS and better protect the homeland and regional allies. An MRDR would include BMDS threat discrimination improvements to enhance BMD effectiveness against the evolving threat.						
+\$17.800M is required to fund Phase 1, 2 and 3 efforts of the U.S. Forces Korea (USFK) Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area.						
+\$5.000M is required to extend the lifespan of the COBRA DANE radar, a long-range sensor that provides critical coverage of potential North Korean threats. Nearly all of the major COBRA DANE systems have aged well beyond their intended design lifespan and the majority of the radar components are largely obsolete. Upgrades include critical life extension redesign and software re-hosting to ensure continued operations of COBRA DANE.						
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget		230.077	247.345	247.643	-	247.643
Current President's Budget		252.665	278.145	220.876	-	220.876
Total Adjustments		22.588	30.800	-26.767	-	-26.767
• Congressional General Reductions		-8.100	0.000			
• Congressional Directed Reductions		0.000	0.000			
• Congressional Rescissions		0.000	0.000			
• Congressional Adds		0.000	0.000			
• Congressional Directed Transfers		0.000	0.000			
• Reprogrammings		9.842	0.000			
• SBIR/STTR Transfer		-5.154	0.000			
• FY 2017 Request for Additional Appropriations		6.400	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement		19.600	30.800	0.000	-	0.000
• Other Adjustment		0.000	0.000	-26.767	-	-26.767

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Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors	
<p><b>Change Summary Explanation</b></p> <p>The FY 2017 reprogramming of \$+9.842M reflects an increase for initiation of AN/TPY-2 Gallium Nitride (GaN) Transition to Production (TTP). The decrease from PB18 to PB19 in FY 2019 reflects the realignment of the Homeland Defense Radar - Hawaii (HDR-H) from the Ballistic Missile Defense Sensors Program Element 0603884C to the Pacific Discriminating Radar Program Element 0604673C.</p> <p>FY 2017: \$+8.100 transfer of program office to PE0603874C LRDR</p> <p>FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+6.400M was required to address emergency warfighting readiness requirements. \$+6.400M Project MD11-BMDS Radar to implement AN/TPY-2 Noise Mitigation.</p> <p>FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600M was required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.</p> <p>FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$30.800M is required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.</p> <p>PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.</p>		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD11 / BMDS Radars			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD11: BMDS Radars	1,086.043	242.049	244.332	206.836	-	206.836	226.889	241.306	240.203	237.978	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note N/A												
A. Mission Description and Budget Item Justification												
The BMDS Radars project includes development of future AN/TPY-2, COBRA DANE, and UEWR capabilities through system engineering; software development; and testing support. Modeling and Simulation (M&S) efforts include enhanced sensor models, development of Radio Frequency scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDS) M&S architecture, and Verification, Validation, and Accreditation of radar models. United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS) provides rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. This project also funds participation and support for Ballistic Missile Defense System (BMDS) element ground and flight test campaigns and Warfighter games and exercises.												
This project will continue development of discrimination advanced algorithms for the AN/TPY-2, COBRA DANE, Sea Based X-Band (SBX), and the UEWR radars to counter evolving threats. The discrimination improvement effort will develop and field integrated Element capabilities to improve BMDS's ability to identify lethal and non-lethal objects. Sensors will continue development of discrimination improvement mid-term design and test support for SBX and far-term trade analysis and planning.												
Program Operations provides strategic planning, program integration, cost estimating, contracting, financial management, internal reviews and audits, earned-value management, and program assessments for the program office.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									FY 2017	FY 2018	FY 2019	
Title: Basic Development Program									26.749	25.004	25.502	
									Articles: -	-	-	
Description: The Basic Development Program includes development and testing of software maintenance updates to address software trouble reports identified on fielded SW versions and flight/ground test events. Software maintenance updates also includes annual cybersecurity certifications and accreditations, testing for vulnerabilities, and third party assessments of all sensors systems. Software improvement efforts also include optimization of increased processing capabilities. The Basic Development Program also provides analysis of software performance during flight and ground testing of Phased Adaptive Approach (PAA) Phases II and III to conduct Materiel Release Analysis for software delivery. The Materiel Release Closure Plan for the AN/TPY-2 ensures the Reliability, Availability, and Maintainability (RAM) Program promotes reliability growth in the suite of AN/TPY-2 radars via product improvements.												

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors	Project (Number/Name) MD11 / BMDS Radars		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:				
<b>FY 2018 Plans:</b> -Decrease reflects completion of new software build delivery for AN/TPY-2 that incorporates new development capabilities and repairs for identified software maintenance issues  <b>FY 2019 Plans:</b> - SEE ABOVE.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> N/A				
<b>Title:</b> BMDS Radars Modeling & Simulation (M&S)  <b>Articles:</b>  <b>Description:</b> BMDS Radars M&S efforts include enhanced sensor models, development and maintenance of Radio Frequency (RF) scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDS), M&S architecture, and Verification, Validation, and Certification (VV&C) of radar models. This effort includes support for technical and performance assessments using Open Systems Architecture Sensor Models (OSM), Open Systems Architecture Signal Injectors (OSI) and other models/tools, as well as development and sustainment of Digital and Hardware in the Loop (HWIL) representations of the tactical versions of AN/TPY-2, SBX, UEWR, and COBRA DANE Upgrade (CDU). This effort includes support for tactical Requirements verification, including development and VV&C of models for testing electronic protection and objective debris mitigation algorithms. This project also supports war games, Warfighter exercises and training, and execution of element-level ground test campaigns to anchor M&S. Specific and/or unique accomplishments to each FY are as follows:  <b>FY 2018 Plans:</b> -SEE ABOVE  <b>FY 2019 Plans:</b> - SEE ABOVE  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> N/A		23.367 -	24.092 -	23.815 -
<b>Title:</b> Capability Development Program  <b>Articles:</b>  <b>Description:</b> The Capability Development Program provides engineering support to enable compliance with BMD System Specification threat capabilities and addresses advanced threats prevalent in 2017 and beyond. This task includes the redesign		105.047 -	109.919 -	79.477 -

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors	Project (Number/Name) MD11 / BMDS Radars		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
of select components to address obsolescence and improve reliability of the system. This task initiates electronic protection and objective debris mitigation development efforts to reduce or eliminate the effect of corporate clutter and electronic attack on sensors. This effort develops the Post Intercept Assessment (PIA) capability for the SBX and UEWRs. It develops, designs and tests sensor mid-term discrimination improvements for X-Band radars, to include SBX threat discrimination improvements. It also performs object classification performance updates to UEWR radars. This effort funds participation in far-term discrimination improvement threat model specifications and develops discrimination and countermeasure mitigation capability development. Additional software development activities include support to THAAD Launch on Remote (LoR) capability and X86 performance optimization to enhance processing speed. This effort funds the upgrade of the COBRA DANE Automated Data Processing Equipment (ADPE) suite with modern hardware and software to minimize potential mission failure in the near term and ensure supportability beyond the next five years. Specific and/or unique accomplishments to each FY are as follows:  <b>FY 2018 Plans:</b> -Increase reflects initiation of contract through the United States Corps of Engineers to procure, install, and test an Integrated Electronic Security System (IESS) at AN/TPY-2 Forward Based Mode (FBM) Site K. Also includes additional development content associated with active sensor bias monitoring and reporting to support BMDS system track capability. -Complete development and testing of AN/TPY-2 common software that aligns US and FMS software configuration -Initiate studies, evaluations, and systems engineering effort to develop draft element specifications for a potential Atlantic Radar and Medium Range Discriminating Radar (MRDR)  <b>FY 2019 Plans:</b> - SEE ABOVE.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in FY 2019 from FY 2018 reflects completion of the production line transition to Gallium Nitride (GaN) next generation Transmit/Receive module technology from Gallium arsenide (GaAs). Also reflects completion of the initial systems engineering effort to develop draft element specifications for the potential Atlantic Radar and completion of COBRA DANE development efforts associated with replacing the ADPE.				
Title: Sensors Directorate Operations  <b>Articles:</b>  <b>Description:</b> Program Operations provide strategic planning, program integration, cost estimating, contracting, financial management, internal reviews and audits, earned-value management and program assessments for the program office. Specific and/or unique accomplishments to each FY are as follows:  <b>FY 2018 Plans:</b>		71.599 -	65.483 -	66.229 -

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors	Project (Number/Name) MD11 / BMDS Radars		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- SEE ABOVE  FY 2019 Plans: - SEE ABOVE  FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Title: Upgrade Clear Early Warning Radar  Articles:  Description: Upgrade of Clear Early Warning Radar and Cape Cod Early Warning Radar includes adaptation of hardware and software to UEWR infrastructure, support to BMDS communications and architecture work and installation and at site. This project also includes preparation and removal of legacy equipment at each UEWR site. Specific and/or unique accomplishments to each FY are as follows:  FY 2018 Plans: -Decrease reflects completion of Clear and Cape Cod Early Warning Radar upgrades  FY 2019 Plans: -Initiate operations and sustainment activities post operational acceptance to include SATCOM operators and System Administrators  FY 2018 to FY 2019 Increase/Decrease Statement: Increase in FY 2019 from FY 2018 reflects initial sustainment activities for 2 years post operational acceptance		15.287 -	2.034 -	6.613 -
Title: United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS)  Articles:  Description: Rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. Phase 1 provides enhanced discrimination, increases search plan optimization, and updates Position, Navigation, and Timing and Regional Mission Data. Phase 2 will improve debris mitigation to increase raid performance against threats, improve debris tracks on radar resources, and provide search plan upgrades that increase search acquisition and support remote launcher capabilities. Phase 3 provides additional increased search plan capabilities, implementation of the DoD Regional Clock, remote launcher upgrades to integrate AN/TPY-2 with PATRIOT and THAAD systems, and improves proficiencies against advanced threats in complex environments. Specific and/or unique accomplishments to each FY are as follows:  FY 2018 Plans:		0.000 -	17.800 -	5.200 -



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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									FY 2017	FY 2018	FY 2019	
-Complete Phase 2 software upgrades to deliver improved performance, increase battle planning solutions, and increase reliability and availability -Initiate Phase 3 to expand defended areas and increase performance <b>FY 2019 Plans:</b> -Complete Phase 3 to utilize the DoD Regional Clock, expand defended areas and increase capabilities against threats, including improved remote launch capabilities -Initiate studies for an alternative radar mission profile and search plans to support regional engagement with THAAD, Aegis and Patriot <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in FY 2019 from FY 2018 reflects completion of phase 3												
Accomplishments/Planned Programs Subtotals									242.049	244.332	206.836	
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• 0208866C: O&M	459.556	504.058	499.817	-	499.817	502.663	535.391	525.678	567.815	0.000	3,594.978	
• 0208866C: PROCUREMENT	1,585.399	2,417.504	2,432.004	-	2,432.004	1,945.093	1,669.844	1,294.869	1,486.379	0.000	12,831.092	
• 0603179C: Advanced C4ISR	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489	
• 0603882C: Ballistic Missile Defense Midcourse Defense Segment	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing	
• 0603890C: BMD Enabling Programs	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing	
• 0603896C: Ballistic Missile Defense Command and Control, Battle Management & Communication	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing	
• 0603898C: Ballistic Missile Defense Joint Warfighter Support	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing	
• 0603904C: Missile Defense Integration and Operations Center (MDIOC)	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing	

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C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing
• 13999903: <i>Planning and Design, Defense Wide</i>	8.233	8.397	8.525	-	8.525	8.822	0.000	0.000	0.000	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
The Radar Development Contract (RDC) awarded on Nov 1, 2017 supports the Sensors Directorate's X-Band Radars (XBR). Ballistic Missile Defense System (BMDS) capability and performance requirements, which underpin continuing XBR development requirements include, but are not limited to, the Army/Navy Transportable Radar Surveillance and Control (AN/TPY-2) radar and the Sea-Based X-Band (SBX) radar. These requirements stem directly from formal Warfighter requirements as developed in the United States Strategic Command (USSTRATCOM)-led Warfighter Involvement Process (see USSTRATCOM Special Instruction (SI) 538-3, Missile Defense Warfighter Involvement Process, June 25, 2008). Achievable requirements documented in the Prioritized Capabilities List (PCL) and Modification and Fielding Requirements List (MFRL) are translated via the BMDS architecture and system specifications into flow-down requirements, characteristics, and capability needs for individual BMDS program specifications, and ultimately are approved through the systems engineering and baseline change management process for BMDS programs to execute. The RDC supports the XBRs for product improvement, including developmental upgrades of software and development of hardware and software to meet enhanced capabilities and risk reduction measures; warfighter support, including wargames and exercise support; engineering services, including engineering support for delivered and accepted radars to facilitate maintenance efforts which may include, but are not limited to, hardware obsolescence studies, hardware redesign, technology insertion and refurbishment; BMDS test subject matter expert (SME) support; modeling and simulation SME support; and cybersecurity. These support activities are for all AN/TPY-2 radars, in the Forward Based Mode (FBM) and Terminal Mode (TM), and the SBX Radar to include the Weather Air Search Radar (WxASR) located on the SBX platform.											

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<p>The BMDS Communications System Complex-Transportable (BCSC-T) Program Plan addresses the design, development, acquisition, testing, integration, activation, and fielding of the BCSC-T. The overall executing agent is the Program Manager Defense Communications and Transmission Systems (PMDCATS). Lockheed Martin Mission Systems (C2BMC prime contractor) via an Other Transaction Agreement provides on-site support.</p> <p><b><u>E. Performance Metrics</u></b> N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD11 / BMDS Radars					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Basic Development Program - Information Assurance AN/TPY-2	SS/CPAF	Raytheon : MA	15.422	3.531	Nov 2016	3.722	Nov 2017	3.802	Nov 2018	-		3.802	Continuing	Continuing	Continuing
Basic Development Program - Information Assurance SBX	SS/CPAF	Raytheon : MA	0.652	0.203	Oct 2016	0.223	Oct 2017	0.225	Oct 2018	-		0.225	Continuing	Continuing	Continuing
Basic Development Program - Material Release Get Well Plan	SS/CPAF	Raytheon : MA	12.820	1.700	Dec 2016	2.045	Dec 2017	2.082	Dec 2018	-		2.082	Continuing	Continuing	Continuing
Basic Development Program - Prior year Capability Development no longer funded in the FYDP	Various	Various : Various	8.778	0.000		0.000		0.000		-		0.000	0.000	8.778	0.000
Basic Development Program - Sys Integration & Tech Assessments	SS/CPAF	Raytheon : MA/AL	17.220	2.966	Mar 2017	3.273	Mar 2018	2.824	Mar 2019	-		2.824	Continuing	Continuing	Continuing
Basic Development Program - X-Band Software Enhancements/ Development	SS/CPAF	Raytheon : AL	75.623	18.349	Jan 2017	15.741	Jan 2018	16.569	Jan 2019	-		16.569	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - M&S Development	SS/CPFF	Raytheon, Northrup Grumman : MA, CO	116.552	14.475	Nov 2016	17.058	Nov 2017	16.656	Nov 2018	-		16.656	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - VV&A of Models	MIPR	AMRDEC : AL	41.388	6.893	Dec 2016	5.037	Dec 2017	5.124	Dec 2018	-		5.124	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - Warfighter Exercises	SS/CPFF	Raytheon : MA	8.341	1.999	Feb 2017	1.997	Feb 2018	2.035	Feb 2019	-		2.035	Continuing	Continuing	Continuing
Capability Development Program - AN/TPY-2 Capability Development	SS/CPAF	Raytheon : MA	84.518	40.421	Oct 2016	34.940	Oct 2017	24.012	Nov 2018	-		24.012	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors					Project (Number/Name) MD11 / BMDS Radars				
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Capability Development Program - AN/TPY-2 GaN TTP	SS/CPAF	Raytheon : MA	4.878	9.842		10.200	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Atlantic Radar Study	MIPR	JHU/APL, NSWC, MDA : AL	0.000	0.000		5.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - COBRA DANE Upgrades	TBD	TBD : TBD	0.000	16.000	Apr 2017	5.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Electronic Protection	SS/CPAF	Raytheon, GTRI : MA, GA	4.625	10.272	Oct 2016	7.659	Oct 2017	8.911	Oct 2018	-		8.911	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Discrimination	C/CPAF	USAF, Raytheon : Hanscom AFB MA	73.757	26.061	Jan 2017	24.900	Nov 2017	24.854	Jan 2019	-		24.854	Continuing	Continuing	Continuing
Capability Development Program - Homeland Defense Radar - Hawaii (HDR-H) Studies and Analysis	MIPR	JHU/APL, NSWC, MDA : MD, AL, VA	0.000	2.451	Jan 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Homeland Defense Radar - Pacific (HDR-P) Study	MIPR	JHU/APL, NSWC, MDA : MD, VA, AL	0.000	0.000		5.000	Feb 2018	5.000	Feb 2019	-		5.000	Continuing	Continuing	Continuing
Capability Development Program - Integrated Electronic Security System (IESS) Site K	MIPR	US Corps of Engineers : Germany	0.000	0.000		6.820	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Post Intercept Assessment (PIA)	C/CPAF	Raytheon : MA	0.000	0.000		10.400	Jan 2018	6.700	Dec 2018	-		6.700	Continuing	Continuing	Continuing
Capability Development Program - Prior year	Various	Various : Various	22.753	0.000		0.000		0.000		-		0.000	0.000	22.753	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MD11 / <i>BMDs Radars</i>					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Capability Development no longer funded in the FYDP															
Capability Development Program - SBX Capability Development	SS/CPAF	Raytheon : MA	0.000	0.000		0.000		7.000	Jan 2019	-		7.000	Continuing	Continuing	Continuing
Capability Development Program - UEWR Capability Development	SS/CPAF	Raytheon : MA	0.000	0.000		0.000		3.000	Jun 2019	-		3.000	Continuing	Continuing	Continuing
Sensors Directorate Operations - Army Hybrid Program Office	MIPR	SMDC : AL	4.718	1.250	Dec 2016	1.865	Dec 2017	2.038	Dec 2018	-		2.038	Continuing	Continuing	Continuing
Sensors Directorate Operations - Govt Salaries, Travel, Training (MDA Sensors)	Various	MDA : AL, VA, MA	132.828	24.029	Oct 2016	22.026	Oct 2017	22.003	Oct 2018	-		22.003	Continuing	Continuing	Continuing
Sensors Directorate Operations - MiDAESS, FFRDC/UARC	SS/CPAF	CSS, APL, LL, OGA, GTRI, MITRE : AL,MA, VA, MD, GA	252.418	38.789	Jan 2017	32.431	Nov 2017	33.431	Nov 2018	-		33.431	Continuing	Continuing	Continuing
Sensors Directorate Operations - Network and Infrastructure Services	C/CPAF	Northrop Grumman/ IJacobs Eng : AL, AK, CA, CO, HI, NM, VA	30.899	4.684	Feb 2017	6.205	Feb 2018	6.056	Feb 2019	-		6.056	Continuing	Continuing	Continuing
Sensors Directorate Operations - Other Govt Agencies	MIPR	SMDC/AL, Hanscom AFB : MA	29.546	2.847	Feb 2017	2.956	Feb 2018	2.701	Feb 2019	-		2.701	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - BCN Upgrades	MIPR	MDA C2BMC / DISA : MA, AK	18.303	0.330	Jun 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Facilities Site Activation/Admin Comms	MIPR	MDA C2BMC : MA, AK	6.252	1.197	Nov 2016	0.000		5.282	Dec 2018	-		5.282	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD11 / BMDS Radars					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Upgrade Clear Early Warning Radar - GMD Fire Control Integration	SS/CPAF	Boeing/AK/AL, Raytheon : MA	5.527	0.383	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Prior year Upgrade Clear Early Warning Radar no longer funded in the FYDP	Various	Various : Various	9.218	0.000		0.000		0.000		-		0.000	0.000	9.218	0.000
Upgrade Clear Early Warning Radar - Radar Upgrade -- Prime Contractor	C/CPAF	Raytheon : MA	109.007	13.377	Jan 2017	2.034	Jan 2018	1.331	Jan 2019	-		1.331	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS) - Software Enhancements/ Development	C/CPAF	Raytheon : MA	0.000	0.000		17.800	Jan 2018	5.200	Jan 2019	-		5.200	Continuing	Continuing	Continuing
Subtotal			1,086.043	242.049		244.332		206.836		-		206.836	Continuing	Continuing	N/A
Remarks															
Note: Clear Early Warning Upgrade Program includes upgrade of the Cape Cod EWR.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A
Remarks															
Operations and sustainment of Upgraded Early Warning Radar (UEWR), COBRA DANE (CD), and Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) Radars Contract Logistics Support (CLS) are Operations and Maintenance (O&M) Defense-Wide appropriations and are described in the Missile Defense Agency (MDA) O-Documents.															

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Missile Defense Agency												<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 0400 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				<b>Project (Number/Name)</b> MD11 / <i>BMDS Radars</i>				

  

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

  

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

  

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	1,086.043	242.049		244.332		206.836		-		206.836	Continuing	Continuing	N/A

**Remarks**  
N/A



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency										Date: February 2018																					
Appropriation/Budget Activity 0400 / 4										R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors										Project (Number/Name) MD11 / BMDS Radars											
Significant Event Complete ▲					Milestone Decision Complete ★					Element Test Complete ◆					System Level Test Complete ●					Complete Activity ◆											
Significant Event Planned △					Milestone Decision Planned ☆					Element Test Planned ◇					System Level Test Planned ○					Planned Activity ◇											
										FY 2017		FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023				
IMTP v19.1 war game and exercise event details are at a higher classification.										◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
SNG-A-D-1											◆																				
SNG-U-H-1												◆																			
SNG-C-D-2													◇																		
SND-A-H-2													◇																		
SNG-U-D-2													◇																		
SNG-S-H-2													◇																		
SNG-C-H-3														◇																	
SNG-S-D-3															◇																
SNG-U-H-4																											◇				
SNG-A-D-4																												◇			
SNG-C-D-3																												◇			
SNG-A-H-4																													◇		

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	<b>Project (Number/Name)</b> MD11 / <i>BMDS Radars</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
IMTP v19.1 war game and exercise event details are at a higher classification.	1	2017	4	2023
SNG-A-D-1	2	2017	2	2017
SNG-U-H-1	3	2017	3	2017
SNG-C-D-2	1	2018	1	2018
SND-A-H-2	1	2018	1	2018
SNG-U-D-2	1	2018	1	2018
SNG-S-H-2	1	2018	1	2018
SNG-C-H-3	2	2018	2	2018
SNG-S-D-3	3	2018	3	2018
SNG-U-H-4	2	2023	2	2023
SNG-A-D-4	3	2023	3	2023
SNG-C-D-3	3	2023	3	2023
SNG-A-H-4	4	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD41 / Homeland Defense Radar - Hawaii (HDR-H)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD41: Homeland Defense Radar - Hawaii (HDR-H)	-	0.000	21.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY 2018 funding is requested to establish the Pacific Radar Budget Project (MD41).

Beginning in FY 2019 the Budget Project (MD41) title will change from Pacific Radar to Homeland Defense Radar - Hawaii (HDR-H)

Beginning in FY 2019 the Homeland Defense Radar - Hawaii (HDR-H) will be realigned to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.

**A. Mission Description and Budget Item Justification**

The mission of the Homeland Defense Radar - Hawaii (HDR-H) program office is to define, develop, acquire, field, and sustain the radar as an element of the BMDs. The initial fielding of Configuration 1 is planned for FY 2023 with an Operational Capability Declaration projected in the FY 2025 time-frame. The HDR-H provides persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of Hawaii against long-range missile threats. The HDR-H is comprised of an equipment shelter, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure.

The HDR-H will be integrated into the BMDs through the C2BMC system and will feature a scalable and open system architecture to mitigate evolving threats. The radar also supports additional mission areas including Space Situational Awareness.

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Homeland Defense Radar - Hawaii (HDR-H)	0.000	21.000	0.000
<b>Articles:</b>	-	-	-
<b>Description:</b> The HDR-H program, previously Pacific Radar, includes requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and Models and Simulation (M&S) efforts for radar development. Efforts include site activation and preparation of site infrastructure for construction activities and completion of formal environmental impact statements. The program will develop and integrate C2BMC systems for HDR-H functionality. The program will develop and deliver radar software Build 1 and establish the Independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, and test of long lead components. Specific and/or unique accomplishments to each FY are as follows:			
<b>FY 2018 Plans:</b>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD41 / Homeland Defense Radar - Hawaii (HDR-H)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019
-Complete environmental, geotechnical, and other studies for environmental compliance and inform military construction (MILCON) design efforts -Initiate prime contract award and developmental engineering for radar hardware, software and equipment shelter -Initiate preparation for the HDR-H System Requirements Review (SRR) -Initiate preparation of the HDR-H Integrated Baseline Review (IBR)  <b>FY 2019 Plans:</b> -Decrease in FY 2019 from FY 2018 reflects the Homeland Defense Radar - Hawaii (HDR-H) realignment to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in FY 2019 from FY 2018 reflects the Homeland Defense Radar - Hawaii (HDR-H) realignment to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.												
Accomplishments/Planned Programs Subtotals										0.000	21.000	0.000
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• 0603882C: Ballistic Missile Defense Midcourse Defense Segment	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing	
• 0603884C: SENSORS MILCON	166.670	0.000	174.000	-	174.000	0.000	0.000	0.000	0.000	0.000	340.670	
• 0603896C: Ballistic Missile Defense Command and Control, Battle Management & Communication	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing	
• 0604673C: Pacific Discriminating Radar	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537	
• 31299903: MILCON PLANNING and DESIGN	15.000	0.000	14.184	-	14.184	49.482	38.424	8.009	8.160	0.000	133.259	
Remarks												

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	<b>Project (Number/Name)</b> MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>
<b><u>D. Acquisition Strategy</u></b> The HDR-H acquisition strategy was approved in December 2017. The HDR-H procurement will be the first delivery order of a multi-radar IDIQ contract that will include the full/open competitive award for the HDR-H. Additional radar delivery orders will be awarded based on competitively priced common hardware and software components plus site specific shelter and integration scope. MDA plans to award the HDR-H by 4Q FY 2018 and the prime contractor will manage, develop, build and integrate, test, and field the radar. The prime contract will include other fixed price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives will be included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. The HDR-H is expected to complete DD250 and initial fielding in FY 2023.		
<b><u>E. Performance Metrics</u></b> N/A		

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Missile Defense Agency												<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 0400 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>						<b>Project (Number/Name)</b> MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>			
<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Homeland Defense Radar - Hawaii (HDR-H) - Prime Contractor	TBD	TBD : TBD	0.000	0.000		18.000	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii (HDR-H) - Program Office	Various	MDA : AL	0.000	0.000		3.000	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.000	0.000		21.000		0.000		-		0.000	Continuing	Continuing	N/A
<b>Remarks</b> N/A															
			<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>			0.000	0.000		21.000		0.000		-		0.000	Continuing	Continuing	N/A
<b>Remarks</b> N/A															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency															Date: February 2018									
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors										Project (Number/Name) MD41 / Homeland Defense Radar - Hawaii (HDR-H)									
Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆																
Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇																
					FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
Homeland Defense Radar - Hawaii (HDR-H) Development									◇	◇	◇	◇	◇	◇	◇	◇	◇	◇						
System Requirements Review (SRR)											△													
Preliminary Design Review (PDR)												△												
Developmental Baseline Review (DBR)													△											
Critical Design Review (CDR)														△										
DD-250																		△						
Initial Fielding																		△						

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	<b>Project (Number/Name)</b> MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Homeland Defense Radar - Hawaii (HDR-H) Development	3	2018	4	2023
System Requirements Review (SRR)	3	2019	3	2019
Preliminary Design Review (PDR)	3	2020	3	2020
Developmental Baseline Review (DBR)	4	2020	4	2020
Critical Design Review (CDR)	1	2021	1	2021
DD-250	3	2023	3	2023
Initial Fielding	4	2023	4	2023



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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MC11 / Cyber Operations			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC11: Cyber Operations	3.871	1.230	3.636	1.079	-	1.079	7.788	4.368	1.145	1.168	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note N/A												
A. Mission Description and Budget Item Justification The funds in this project will be utilized to complete transitioning to and the sustainment of the new DoDI 8510.01 Risk Management Framework (RMF) for DoD Information Technology (IT) requirement for the MDA Sensors Directorate and conduct Security Control Assessments (SCA) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones for MDA Sensors mission systems. It also includes support for external cybersecurity assessments and penetration testing of the Sensors mission systems, both in laboratory Element Cybersecurity Experiments and in ground test activities, in accordance with the Director, Operational Test and Evaluation (DOT&E) directive and the Integrated Master Test Plan (IMTP). It maintains the Assessment and Authorization (A&A) data repository, capturing the RMF documentation (artifacts, validation results, Cybersecurity Risk Assessment results, cybersecurity scorecard, and Authorizing Official (AO) authorization decisions) and POA&M for all MDA information systems.  This project supports the monitoring, prioritization, and tracking of Cybersecurity mitigation detailed in Information Technology security POA&Ms. The activities include preparation of A&A documentation and accreditation recommendations to the MDA Senior Information Security Officer (SISO)/Security Control Assessor (SCA) and Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission; test; and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									FY 2017	FY 2018	FY 2019	
Title: Network / System Assessment and Authorization (A&A)  Articles:									1.230	3.636	1.079	
									-	-	-	
Description: Cyber Operations funds Sensors Directorate Information System Security Manager (ISSM) civilian salaries and cybersecurity engineering and architecture planning for program information technology systems. This project plans and tests the cybersecurity controls for the BMDS and maintains Sensors Risk Management Framework (RMF) authorizations for Sensors-managed information systems, conducts Controls Validation Testing (CVT)/ Security Controls Assessment (SCA) of sensors mission and support systems and provides and maintains Plans of Action and Milestones to mitigate cybersecurity deficiencies. Effort also funds the maintenance of existing. DoD Information Assurance Certification and Accreditation Process (DIACAP) certification and accreditation packages until the transition to RMF is complete in FY 2018. Cyber Operations conducts annual cybersecurity program reviews on the Sensors enclaves to assess compliance in implementing and maintaining controls. Specific and/or unique accomplishments to each FY are as follows:												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MC11 / <i>Cyber Operations</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019
FY 2018 Plans: - Initiate of cybersecurity supply chain compliance												
FY 2019 Plans: - SEE ABOVE.												
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in FY 2019 from FY 2018 reflects the completion of the cybersecurity supply chain compliance												
Accomplishments/Planned Programs Subtotals										1.230	3.636	1.079
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489	
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing	
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing	
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing	
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing	
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing	
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing	
• 0901598C: <i>Management HQ - MDA</i>	30.693	29.947	28.626	-	28.626	27.276	27.894	28.466	29.005	Continuing	Continuing	
• 13999903: <i>Planning and Design, Defense Wide</i>	8.233	8.397	8.525	-	8.525	8.822	0.000	0.000	0.000	Continuing	Continuing	

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 0400 / 4				<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				<b>Project (Number/Name)</b> MC11 / <i>Cyber Operations</i>				
<b>C. Other Program Funding Summary (\$ in Millions)</b>												
	<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
<b>Remarks</b>												
<b>D. Acquisition Strategy</b> N/A												
<b>E. Performance Metrics</b> N/A												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MC11 / <i>Cyber Operations</i>					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Assessment and Authorization (A&A) - CND/IA Advisory and Assistance Services (Booz Allen)	C/CPFF	Booz Allen Hamilton : AL, CO, VA	2.018	0.674	Nov 2016	0.538	Nov 2017	0.509	Nov 2018	-		0.509	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - CND/IA Advisory and Assistance Services (Torch Technologies)	C/CPFF	Torch Technologies : AL, CO, VA	1.300	0.354	Jan 2017	0.353	Jan 2018	0.385	Jan 2019	-		0.385	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - Civilian Salaries	Various	MDA : AL, CO, VA	0.553	0.202	Oct 2016	0.176	Oct 2017	0.185	Oct 2018	-		0.185	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - Cybersecurity Supply Chain Compliance	SS/CPAF	Raytheon : MA	0.000	0.000		2.569	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			3.871	1.230		3.636		1.079		-		1.079	Continuing	Continuing	N/A
Remarks N/A															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			3.871	1.230		3.636		1.079		-		1.079	Continuing	Continuing	N/A
Remarks N/A															

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**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency**

**Date:** February 2018

**Appropriation/Budget Activity**

0400 / 4

**R-1 Program Element (Number/Name)**

PE 0603884C / Ballistic Missile Defense  
Sensors

Project (Number/Name)	Start Date	End Date	Status	Manager	Budget (USD)	Actual Cost (USD)	Progress (%)	Risk Level	Notes
101/Alpha	2023-01-15	2023-03-31	Completed	J. Doe	150000	148000	100	Low	Exceeded budget by 20000
102/Beta	2023-02-01	2023-05-15	In Progress	A. Smith	220000	180000	82	Medium	Minor delays in procurement
103/Gamma	2023-03-10	2023-06-30	On Hold	M. Chen	90000	0	0	High	Waiting for client approval
104/Delta	2023-04-01	2023-07-31	Planned	S. Kim	300000	0	0	Medium	Initial planning phase
105/Epsilon	2023-05-01	2023-08-31	Not Started	L. Garcia	180000	0	0	Low	Contract review in progress

MC11 / Cyber Operations

Significant Event Complete ▲

Milestone Decision Complete ★

Element Test Complete 

System Level Test Complete

Complete Activity ✦

Significant Event Planned  $\Delta$

Milestone Decision Planned ☆

Element Test Planned 

### System Level Test Planned

Planned Activity ✦

[illegible]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Missile Defense Agency			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	<b>Project (Number/Name)</b> MC11 / <i>Cyber Operations</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Transition to Cyber Security Risk Management Framework (CRMF)	1	2017	4	2023
Information Assurance Certification and Accreditation (C&A) Package Preparation / Submission	1	2017	4	2023
Cyber Security Program Policy / Risk Management	1	2017	4	2023
Cyber Security Mitigation Monitoring and Tracking	1	2017	4	2023
BMDS Cyber Security Policy Development	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD40 / Program-Wide Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: Program-Wide Support	75.992	9.386	9.177	12.961	-	12.961	15.561	21.828	22.410	21.127	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Program Wide Support reflects proportional changes as a result of budget changes in the Ballistic Missile Defense Sensors program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

**A. Mission Description and Budget Item Justification**

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Program Wide Support	9.386	9.177	12.961
<b>Articles:</b>	-	-	-
<b>Description:</b> N/A			
<b>FY 2018 Plans:</b> N/A			
<b>FY 2019 Plans:</b> N/A			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	9.386	9.177	12.961

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Missile Defense Agency		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A		
<b>Remarks</b>		
<b>D. Acquisition Strategy</b> N/A		
<b>E. Performance Metrics</b> N/A		



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD40 / Program-Wide Support					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	8.022	0.192	Jul 2017	0.184	Jul 2018	0.075	Jul 2019	-		0.075	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	MIPR	Various : Multi: AL, CO, NM, VA, Various	8.251	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi:AL,VA	11.077	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (Reqn)	Reqn	Department of Labor : Washington, DC	0.170	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, CA, VA	42.217	8.943	Aug 2017	8.641	Aug 2018	12.886	Mar 2019	-		12.886	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support civilian Salaries, Travel, Training	Allot	MDA : Multi:AK, AL,CA, CO, VA	3.938	0.251	Nov 2016	0.352	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	C/CPAF	JRDC : JRDC	0.587	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, CA, VA	1.730	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			75.992	9.386		9.177		12.961		-		12.961	Continuing	Continuing	N/A
Remarks N/A															

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Missile Defense Agency										<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 0400 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603884C / <i>Ballistic Missile Defense Sensors</i>					<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>			
	<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	75.992	9.386		9.177		12.961		-		12.961	Continuing	Continuing	N/A
<b>Remarks</b> N/A													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency																	Date: February 2018													
Appropriation/Budget Activity 0400 / 4										R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>										Project (Number/Name) MD40 / <i>Program-Wide Support</i>										
Significant Event Complete ▲					Milestone Decision Complete ★					Element Test Complete ◆					System Level Test Complete ●					Complete Activity ◆										
Significant Event Planned △					Milestone Decision Planned ☆					Element Test Planned ◇					System Level Test Planned ○					Planned Activity ◇										
										FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023								
MD40 Program-Wide Support										◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency			Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023